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United States
Department of
Agriculture

Soil
Conservation
Service

Bozeman,
Montana



Are you ready for the next drought?



Drought—a manager's test

AD-33 Bookplate
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You don't have to describe a drought to a Montana rancher. Chances are he's experienced periods of extended dryness. He's watched his native grasses stay brown year-round and his cows kick up a dust cloud searching for water and grass.

Drought is currence. It's a phenomenon of Great Plains weather cycles, and it's reflected in the average rainfall and kinds of plants that grow on the plains.

If drought is not planned for, any livestock operation may suffer. But even when it is planned for, serious adjustments must be made.

Planning shows

Planning is the key. A good range management plan considers the extremes in climate

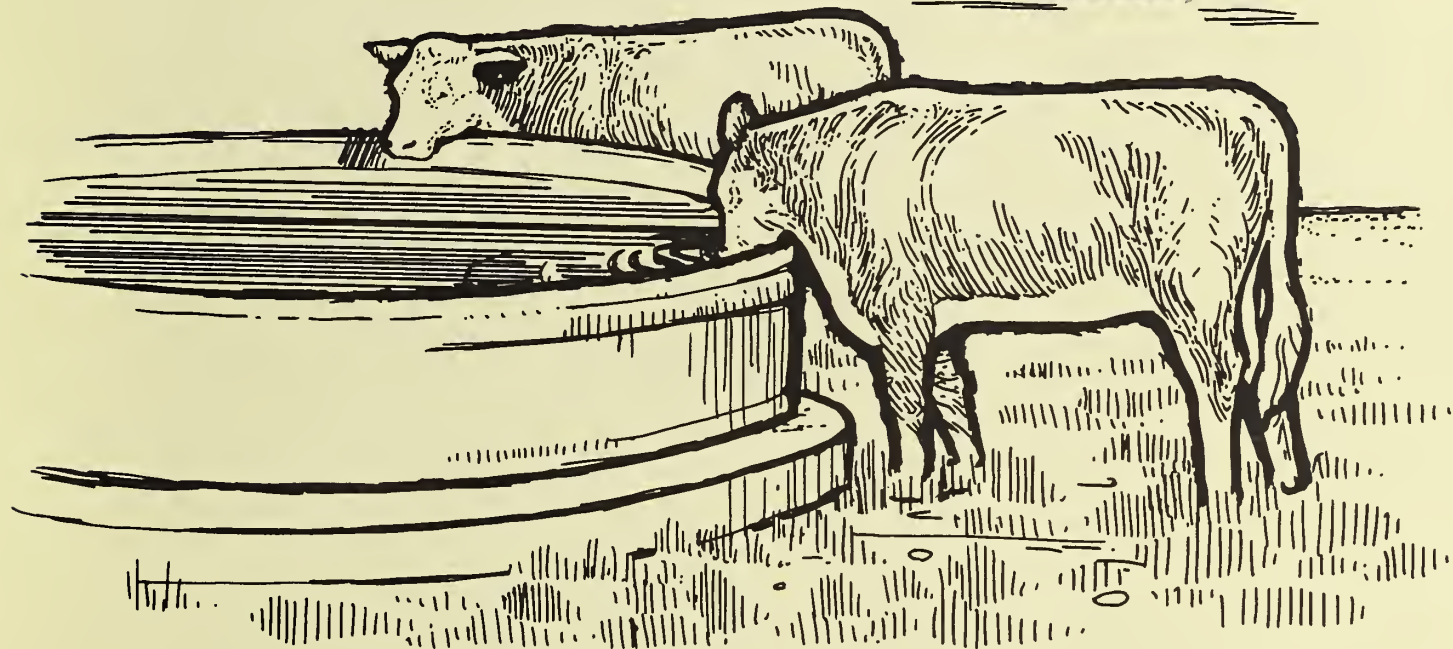
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to assure range resilience. The plan can guide a livestock producer through both short and prolonged periods of drought.

To manage successfully under the constant threat of drought, the stockman needs to know how drought affects plants and their management and what options exist to avoid the extreme consequences of both ruining the range and selling his livestock.

This pamphlet highlights the effects of a drought on rangeland and offers some broad guidelines for actions before, during, and after a drought. For specific recommendations on your operations, contact your local Soil Conservation Service office or conservation district.

Planning for a drought
includes developing a
dependable supply of stockwater.



Drought hits rangeland hard

Because of the sheer size of the resource in Montana, rangeland usually suffers the most extensive damage during a drought. Seventy percent of Montana is rangeland, and the grass it produces is the lifeblood of the livestock industry.

Grass production is one visible measurement that ranchers can use to judge the severity of drought. They know that during a drought forage production and plant reproduction is reduced. Roots die and stands thin out. Plants enter dormancy, which allows them to save water.

And as the grass production decreases, so does the production of red meat.

Recovery takes time

One year of average or above-average rainfall does not end the effects of drought on rangeland. Usually it takes several years of good moisture conditions for the high-producing, desirable, perennial grasses to recover. The grazing

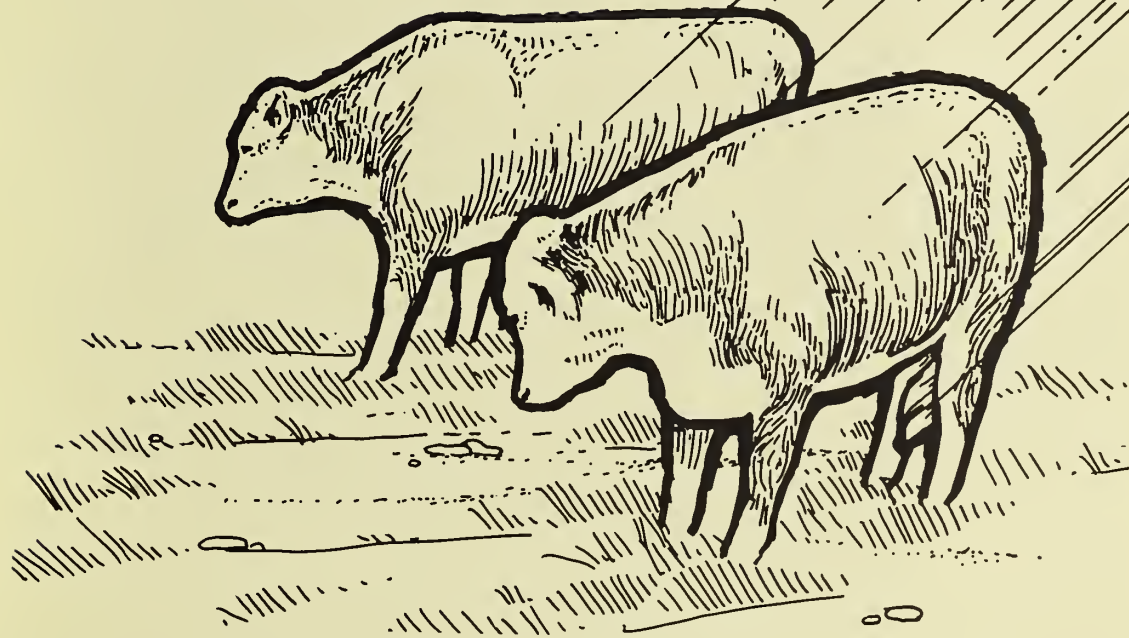
history before and during a drought will partially determine how long recovery takes. Growth of moderately or heavily grazed plants is slower than lightly grazed or ungrazed plants.

During the first year following a drought, the lower-producing, less desirable annual and perennial grasses and forbs usually appear. The higher-producing, more desirable grasses won't increase markedly—with a couple of exceptions.

Needleandthread and western wheatgrass do grow quite tall the first year. However, the total perennial grass production is still below average, and the rangeland hasn't fully recovered from the drought.

One year of average rainfall won't end the effects of a drought. It takes several years depending on range conditions.

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Drought—during, after, and before

No one can mark on a calendar the day drought begins or ends. Yet every rancher can tell you when he is in drought, coming out of one, or in average or above-average rainfall periods.

But no matter when—during, after, or before the next drought—there are measures a rancher can take to lessen the effects and prepare for the next one. Successful, grass-savvy ranchers on the Great Plains run their operations as if the next drought will begin tomorrow.

Let's outline some of those drought-related measures.

During a drought

During a drought the goal is to get through it without damaging the rangeland and yet keep the ranch operation financially solvent.

✓ Before ranchers can weigh possible options, they must have a clear picture of all available resources. They should inventory forage supplies—both availability and cost—and livestock.

✓ Recognize that there is drought and that range and pasture productivity will decrease. Droughts may well mean reduced stock numbers. *Do not let the livestock condition serve as an index of range utilization.* Animal performance can remain stable and even improve while the range is being severely damaged.

✓ If ranchers have to reduce the grazing pressure to match forage supplies, they should keep only healthy, early- to mid-aged productive cows and ewes. They should cull animals that calf or lamb late regardless of age and keep fewer replacements. Market livestock earlier.

✓ Wean early and sell or feed at home or at another feedlot. Calf and lamb performance will stay up and the cows or ewes won't get as poor. In extreme drought, calves can be weaned early and treated like dairy calves. This will be better than allowing both poor calf and cow performance.

✓ Allow plants to maintain their present level of vigor with light to moderate use of forage. Defer use if at all possible. Root systems on range plants will be

reduced during drought, and the plant will need to make as much growth as possible. Light grazing following dormancy would be preferable. Supplemental feed or forage must be available if use is deferred.

- ✓ Save and use straw from cropland. Straw and a protein supplement will stretch grass and hay supplies. Enough stubble needs to be maintained to protect the cropland from wind erosion.

- ✓ If the drought is forecast to continue, consider planting winter wheat for early grazing in the spring

- ✓ Work to improve livestock distribution. Place salt blocks in little-used areas. If emergency water is provided, place the tanks near these areas.

- ✓ Stockwater may be a serious problem. Graze areas first where

the water source may fail later in the season. Provide emergency water if necessary, but prepare for high costs.

- ✓ Drinking on alternate days will not lower production of dry cows and yearlings. A lactating animal needs water daily or calf gains will be reduced by one-half or more. Studies have shown that lactating cows drink 15 gallons per day in summer. The amount will depend on temperature, terrain, and other conditions.

- ✓ Develop all the water, even if it is marginal. A marginal water development will give you more than you had before. Remember the maxim: "There is no such thing as too much water development on a ranch."

- ✓ Clean springs and fence them. Cover water tanks to reduce evaporation.

- ✓ Use reserve pastures in your grazing system—the ones you left for use during drought.

- ✓ Consider leasing pasture.

- ✓ Supplement low-quality feed, but do not substitute feed. If supplemented, livestock should forage better; if substituted, they will not.

After a drought

After the drought the goal is to give the rangeland a chance to recover and return to normal production.

- ✓ Implement management plans. Use grazing systems with moderate stocking rates to allow the important, desirable grasses to regain vigor and reestablish. On heavily used rangeland, this may call for deferred grazing

until the plants have made sufficient growth. Rest as many pastures as possible.

✓ Avoid early, sustained use of pastures that were used heavily either before or during the drought. It could take these pastures longer to recover.

✓ Continue to strive for maximum distribution of livestock.

✓ Don't hastily decide to reseed or mechanically treat rangeland. A deteriorated range recovers quickly following drought if properly managed. Deferment and rest are often the best prescription for a deteriorated range.

✓ Review your range management plan and adjust it to offset the impacts of the next drought.

Before a drought

Before the next drought the goal is to get the rangeland into the best possible condition and to continue making improvements that prepare the rangeland for the next drought.

✓ The most important protective measure is to achieve and maintain rangeland in good to excellent condition. Rangeland in high condition provides the most protective vegetative cover—a diverse and uniquely adapted mixture of plants that can withstand droughty periods.

✓ Stock the range properly. Moderate grazing during normal or wet cycles allows the desirable plants to become deeply rooted and healthy. Healthy rangeland is more effective in reducing drought damage

than the removal of livestock when drought occurs.

✓ In addition to proper grazing, all possible water saving and moisture conserving measures should be implemented.

✓ Stock your operation so heavy grazing does not occur more than one out of four or five years in any pasture. Proper stocking and a good grazing system will reserve some old grass to use with the shorter new growth in drier years. It also reduces the need for emergency sale of stock.

Studies have shown that when 60 percent or more of a plant's growth is grazed, the plant's ability to regenerate is decreased. Light use (25 percent or less of the current growth), however, stimulates regeneration. Moderate use (25 to 60 per-

cent of the current growth) does not seem to affect the reproduction.

Besides affecting the rate of recovery of range plants, stocking rates during a drought also affect red meat production. Unless the stocking pressures are reduced to match forage availability, weaning weights decrease. Research also shows that near-normal weights can be expected when rangeland is stocked in relation to the reduced forage supply.

The New Mexico College of Agriculture and Mechanical Arts prepared a table that showed how stocking rates affect the daily forage rates and weight of cows and the calf crop percentage and weight (Table 1). The table shows that heavier stocking rates decrease forage rates,

the weight of the cows and calves, and percentage of calf crop raised.

Proper stocking rates alone do not completely eliminate drought problems. However, proper stocking coupled with a grazing system takes care of the

period of one or two dry years—the most common situation faced by Montana stockmen. Adjustments should be made on an individual ranching basis because many ranches are operating at optimum stocking levels.

Table 1 - Livestock production resulting from rates of stocking.

Cows (number)	78	87	100	116
Forage produced yearly (lbs) ..	600,000	600,000	600,000	600,000
Potential normal weight				
per cow (Lbs)	1,000	1,000	1,000	1,000
Actual weight per cow (lbs) ..	1,000	850	750	650
Daily forage per cow (lbs)	21.0	18.7	16.6	14.3
Calf crop raised (%)	90	70	50	30
Weight of calf (lbs)	400	360	320	280

(From Press Bulletin 910, New Mexico College of Agriculture & Mechanical Arts)

Drought—man-made or natural?

Not all droughts are caused by nature. Some ranges suffer through a man-made drought every year. But man-made or natural, both have the same cause—a lack of available moisture.

Moisture-use decides

The key to finding the difference is what happens to the available moisture. Montana's shallow-rooted range plants depend on surface moisture for growth. If this moisture isn't available, production is nil.

If a range receives above average moisture and still doesn't produce new plant growth, it is suffering from a man-made drought. Instead of being properly used, the available moisture runs off the soil and erosion results. This

situation can be turned around with an improvement in range condition and vegetative cover.

Research has demonstrated that water intake rates are much higher when good vegetation cover exists and it is grazed at a light to moderate intensity.

Research shows that water intake rates on moderately fine-textured, loam-clay loam soils

are three times greater on lightly grazed range. Table 2 shows the water intake rates as well as production, mulch, and reduced runoff. This table shows that less intensive use provides benefits of increased forage production, better water intake into soil, and less runoff. The stocking rates will vary considerably depending on location.

Table 2 - Grazing intensity, water rate, and runoff.

Grazing Intensity (Acres/AUM)	Total Production (lbs/ac)	Mulch (lbs/ac)	Rate of Water Intake (in/hr)			Approximate Percent of Runoff
			First 30 min.	Second 30 min.	Average	
1.35 (heavy use)	910	456	1.40	0.71	1.05	61
2.42 (moderate use)	1,345	3.99	2.16	1.21	1.69	41
3.25 (light use)	1,869	1,100	3.19	2.72	2.95	15

Proper grazing is important

The key to increased water intake rates is proper grazing. Excessive grazing and trampling by livestock seals the soil surface. Consequently, rain and snowmelt cannot penetrate the surface and the moisture runs off.

Rangeland in good or excellent condition with comparable soils have a crumbly or granular surface structure, which is conducive to a high water intake rate.

Proper grazing also encourages the native, perennial, deep-rooted grasses that more fully utilize the moisture that falls.

Improper grazing encourages the growth of shallow-rooted grasses that cannot use all the moisture that falls in a

normal year. After their limited water intake rates are satisfied, the remaining moisture either percolates below the depth of their roots or runs off the surface.

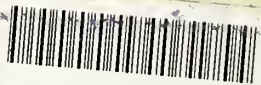
In the case of badly damaged rangeland, this excess moisture runs off the surface, satisfying no plant needs and often causing erosion. Rangeland in this condition is in a drought every year.



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Assistance provided by the
Soil Conservation Service is
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national origin.

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The best drought protection is to maintain rangeland in good to excellent condition.